Corinth Pellets, LLC
Penobscot County
Corinth, Maine
A-956-71-H-A (SM)

Departmental
Findings of Fact and Order
Air Emission License
Amendment #4

FINDINGS OF FACT

After review of the air emission license amendment application, staff investigation reports and other documents in the applicant's file in the Bureau of Air Quality, pursuant to 38 Maine Revised Statutes Annotated (M.R.S.A.), §344 and §590, the Maine Department of Environmental Protection (Department) finds the following facts:

I. REGISTRATION

A. Introduction

Corinth Pellets, LLC (Corinth Pellets) was issued Air Emission License A-956-71-C-R on September 18, 2013 permitting the operation of emission sources associated with their wood pellet manufacturing facility. The license was subsequently amended on August 7, 2014 (A-956-71-E-A), December 3, 2014 (A-956-71-F-A), and on July 2, 2015 (A-956-71-G-M).

Corinth Pellets has requested an amendment to their license in order to do the following:

1. Amend their Best Available Control Technology (BACT) analysis to remove the requirement to operate the multiclone;
2. Revise emission limits for the exhaust from Burner #1 and Dryer #1;
3. Establish an annual limit of pellets produced; and
4. Replace an existing cyclone with a new dust collector.

The equipment addressed in this license is located at 74 Hob Road, Corinth, Maine.

B. Emission Equipment

The following equipment is addressed in this air emission license:

Fuel Burning Equipment

Equipment	Maximum Capacity (MMBtu/hr)	Maximum Firing Rate (ton/hr)	Fuel Type	Install. Date	Stack #
Burner #1	45	4.2[c]	wood/biomass	2015	1

[c] Based on firing wood with a moisture content of 40% by weight.

Process Equipment

Equipment	Max Finished Material Process Rate	Pollution Control Equipment	Stack #
Dryer #1	18.0 ODT/hr[b]	Cyclone & Multiclone	1

[b] Based on converting to a moisture content of 0% by weight and referred to as oven-dried tons per hour (ODT/hr)

C. Application Classification

The modification of a minor source is considered a major or minor modification based on whether or not expected emission increases exceed the "Significant Emission" levels as defined in the Department's *Definitions Regulation*, 06-096 CMR 100 (as amended). The emission increases are determined by subtracting the current licensed annual emissions preceding the modification from the maximum future licensed annual emissions, as follows:

Pollutant	Current License (TPY)	Future License (TPY)	Net Change (TPY)	Significant Emission Levels
PM	37.5	90.2	+52.7	100
PM_{10}	37.5	90.2	+52.7	100
$PM_{2.5}$	37.5	90.2	+52.7	100
SO_2	2.1	3.8	+1.7	100
NO_x	12.8	30.7	+17.9	100
CO	97.5	90.2	-7.3	100
VOC	49.9	49.9	-0-	50

This modification is determined to be a minor modification and has been processed as such.

II. BEST PRACTICAL TREATMENT (BPT)

A. Introduction

In order to receive a license, the applicant must control emissions from each unit to a level considered by the Department to represent Best Practical Treatment (BPT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). Separate control requirement categories exist for new and existing equipment.

BPT for new sources and modifications requires a demonstration that emissions are receiving Best Available Control Technology (BACT), as defined in *Definitions Regulation*, 06-096 CMR 100 (as amended). BACT is a top-down approach to selecting air emission controls considering economic, environmental and energy impacts.

B. Burner #1 & Dryer #1

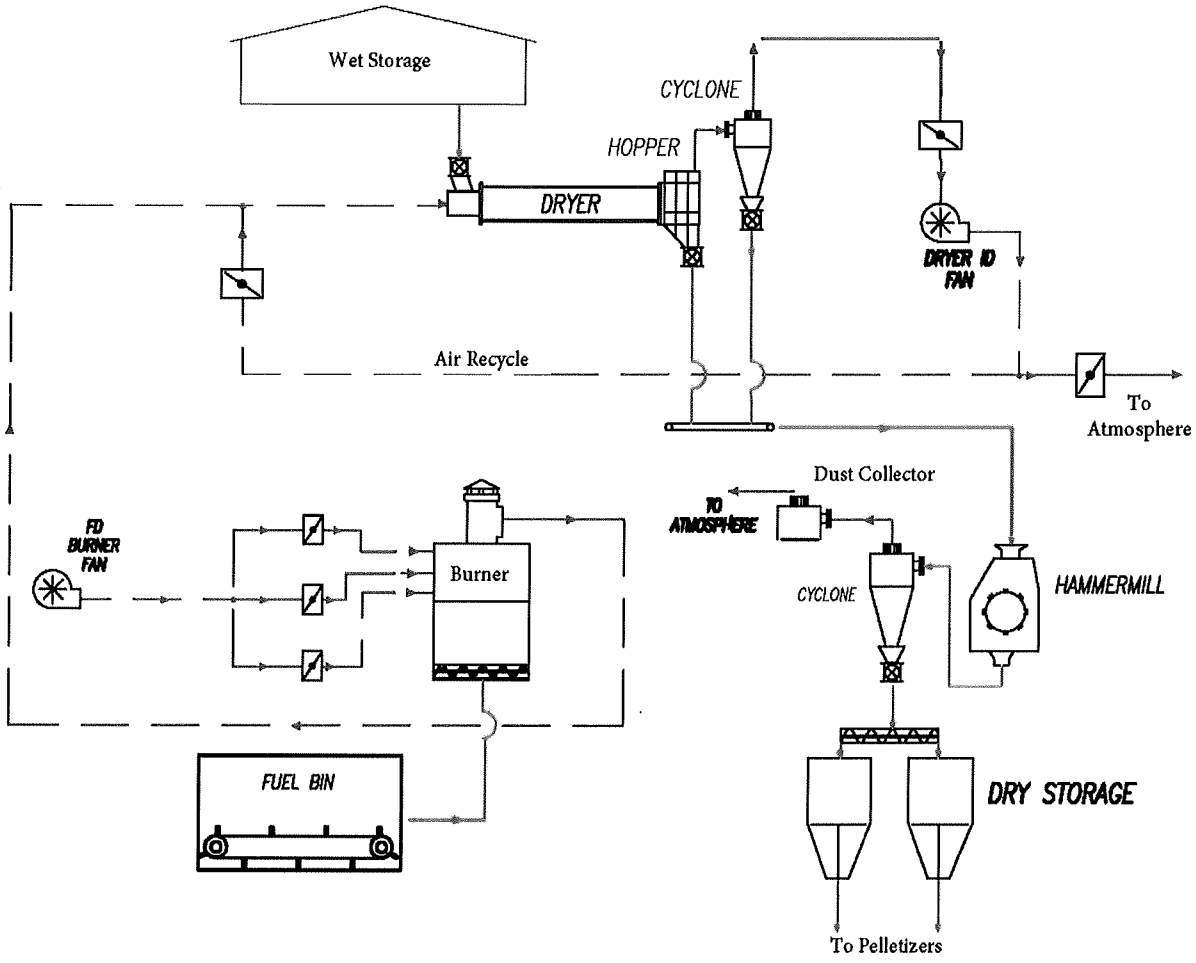
Corinth Pellets produces wood pellets to be sold as fuel for pellet fired wood stoves. In January 2015, the facility replaced their existing rotary dryers with a new burner (Burner #1) and single-pass rotary dryer (Dryer #1).

Heat to the system is provided by Burner #1 which is a wood-fired burner with a maximum heat input of 45 MMBtu/hr. Wet wood chips, shavings, and sawdust are introduced into Dryer #1. Hot exhaust gases from Burner #1 are used in Dryer #1 to reduce the moisture content of the wood from approximately 50% by weight to 8-12% by weight.

The exhaust gases pass through a cyclone (single) before being vented to the atmosphere through Stack #1. Approximately 40-60% of the exhaust gases are recycled back to the dryer inlet to improve efficiency and control the temperature and humidity in the dryer system.

The dried wood is processed by a hammermill and conveyed to a storage bin before being used in the pelletizing process. The maximum processing rate of the pelletizers is 14 ton of pellets per hour.

A schematic of the current wood drying process is shown below.



1. Removal of Multiclone

Corinth Pellets' current air emissions license required the installation and operation of a multiclone for control of particulate emissions from Stack #1 (the common exhaust for Burner #1 and Dryer #1). The facility has experienced difficulties maintaining consistent and efficient operation of the multiclone. When the exhaust gases expand in the multiclone chamber, water condenses on the interior surfaces and leads to plugging. This necessitates frequent shutdowns (multiple times per week) to clean the equipment. Frequent startups and shutdowns result in higher emissions than steady state operation.

Preliminary diagnostic testing has indicated that Corinth Pellets may be able to meet the emission limits established in their license without use of the multiclone. Therefore, the Department has determined that operation of the multiclone is not required provided Corinth Pellets can demonstrate compliance with the particulate

matter emission limits. Compliance with the particulate matter lb/hr emission limits is determined to be BACT for the exhaust from Burner #1 and Dryer #1.

2. Emission Limits

a. Pound Per Hour (lb/hr) Limits

Previous emission limits for Stack #1 were based on a maximum dryer throughput of 18 oven-dried tons (ODT) per hour. It has since been determined that the limiting step in the production process is pelletizing. The maximum throughput of the pelletizers is 14 ton/hr. The storage bins between the drying and pelletizing process can only hold approximately one hour's worth of material. Therefore, it can be assumed that the drying operation is also limited to 14 ton/hr. This is a capacity reduction of 22%. Accordingly, the lb/hr emission limits for all pollutants have also been reduced by at least 22%.

Testing has indicated that the licensed emission limits for CO from Stack #1 are excessively high. Corinth Pellets has requested that this emission limit be reduced from 70.2 lb/hr to 21.06 lb/hr. The Department concurs that a reduction in the emission limit is appropriate. An emission limit of 21.06 lb/hr for CO is determined to be BACT for the exhaust from Burner #1 and Dryer #1.

Testing has indicated that the licensed emission limits for VOC for Stack #1 are excessively high. Corinth Pellets has requested that these emission limits be reduced by the following amounts:

	Previous Limit (lb/hr)	**New Limit (lb/hr)**
VOC (hardwood)	18.0	8.55
VOC (SW not including Pine)	37.8	17.95
VOC (Pine)	79.2	37.60

The Department concurs that a reduction in the emission limits is appropriate. The new emission limits listed above for VOC are determined to be BACT for the exhaust from Burner #1 and Dryer #1.

The following emission limits are determined to be BACT for the exhaust from Burner #1 and Dryer #1:

Pollutant	lb/hr
PM	21.06
PM_{10}	21.06
$PM_{2.5}$	21.06
SO_2	0.88
NO_x	7.16
CO	21.06
VOC (hardwood)	8.55
VOC (SW not including Pine)	17.95
VOC (Pine)	37.60

b. Removal of lb/ODT Limits

The current air emissions license establishes emission limits for all criteria pollutants in units of both pounds per hour (lb/hr) and pounds per oven-dried ton of wood processed (lb/ODT). The lb/hr emission limits are required to demonstrate compliance with Maine Ambient Air Quality Standards. Corinth Pellets is subject to 06-096 CMR 105, *General Process Source Particulate Emission Standard* which imposes emission limits in units of lb/hr. The emission limits contained in this license have been determined to be more stringent. No increases are proposed to the lb/hr emission limits and therefore, no additional ambient air quality demonstration will be required as part of this amendment.

The lb/ODT limits were imposed as a method to demonstrate compliance with annual emissions restrictions (i.e. ton/year limits) that keep the facility a minor source. The Department has determined that a more appropriate method for demonstrating compliance with annual restrictions is to limit the tons of pellets produced and to establish emission factors for the pounds of pollutant emitted per ton of pellets produced ($lb/ton_{pellets}$).

An annual production limit of 120,000 $ton_{pellets}$/year is proposed. The maximum process rate of the pelletizers is 14 $ton_{pellets}$/hour. Using the established lb/hr emission limits, an emission factor for calculating annual emissions of each pollutant can be derived as follows:

$$\left(\frac{21.06\ lb_{PM}}{hr}\right) \times \left(\frac{hr}{14\ ton_{pellets}}\right) = 1.504\ lb_{PM}/ton_{pellets}$$

Using this methodology, the following emission factors have been developed:

Pollutant	**lb/ton$_{pellets}$**
PM	1.504
PM_{10}	1.504
$PM_{2.5}$	1.504
SO_2	0.063
NO_x	0.511
CO	0.504
VOC (hardwood)	0.614
VOC (SW not including Pine)	1.286
VOC (Pine)	2.686

Based on these emission factors, compliance with a production limit of 120,000 ton$_{pellets}$/year will ensure the facility stays below major source thresholds for all pollutants except VOC.

Emissions of VOC are dependent upon the species, or mix of species, of wood dried. Softwoods, especially Pine, emit significantly higher levels of VOC. Corinth Pellets is limited to emissions of 49.9 ton/year of VOC. Compliance with the 120,000 ton$_{pellets}$/year production limit and the short term emission limits does not guarantee compliance with the annual ton/year VOC limit. Corinth Pellets must calculate actual emissions of VOC on a monthly and 12-month rolling total basis to demonstrate compliance with the ton/year emission limit.

When calculating emissions of VOC, the emission factors listed above must be prorated based on the percentage of each species processed. For example, if Corinth Pellets processes 5,000 tons of pellets made from 20% hardwood, 65% spruce (i.e. a softwood other than pine) and 15% pine, emissions of VOC would be calculated as follows:

$$\left[\left(\frac{0.614\ lb_{VOC}}{ton_{pellets}}\right)\times 0.20\right]+\left[\left(\frac{1.286\ lb_{VOC}}{ton_{pellets}}\right)\times 0.65\right]+\left[\left(\frac{2.686\ lb_{VOC}}{ton_{pellets}}\right)\times 0.15\right]=1.362 lb_{VOC}/ton_{pellets}$$

$$\left(\frac{1.362\ lb_{VOC}}{ton_{pellets}}\right)\times\left(\frac{ton_{VOC}}{2000\ lb_{VOC}}\right)(5{,}000\ ton_{pellets})=3.405\ ton_{VOC}$$

3. New Dust Collector

Dry wood is fed to a hammermill for final sizing. The wood is then pneumatically conveyed to a cyclone (main cyclone) where the wood is separated from the air stream and conveyed to the pelletizers. The exhaust off the main cyclone, which contains fine wood dust particles, is currently controlled by another cyclone (Cyclone #3) located inside the wet storage building.

Contrary to what is stated in Air Emission License A-956-71-C-R, the reverse air filter baghouse (RAF Baghouse) does not collect or control emissions from the hammermill. The RAF Baghouse scavenges and filters air inside the main building, primarily off the pellet coolers.

Corinth Pellets has proposed replacing Cyclone #3 with a dust collector (Dust Collector #1). Dust Collector #1 is constructed and operated similar to a baghouse except that specialized pleated cartridge filters are used to remove the dust from the air stream rather than bags. It will be located next to the main cyclone.

To meet the requirements of BACT for control of particulate matter emissions from the hammermill, particulate emissions shall be vented through the main cyclone and Dust Collector #1. Visible emissions from Dust Collector #1 are limited to no greater than 10% opacity on a six (6) minute block average basis except for no more than one (1) six (6) minute block average in a 1-hour period. Corinth Pellets shall take corrective action if visible emissions from the dust collector exceed 5% opacity.

All components of the wood conveying systems shall be maintained so as to prevent PM leaks. Visible emissions from wood conveying operations shall not exceed 20% opacity on a six (6) minute block average basis except for no more than one (1) six (6) minute block average in a 1-hour period.

C. Annual Emissions

1. Total Annual Emissions

Corinth Pellets shall be restricted to the following annual emissions, based on a 12-month rolling total. The tons per year limits were calculated based on a production limit of 120,000 $ton_{pellets}$/year and an annual VOC emission limit.

Total Licensed Annual Emissions for the Facility
Tons/year
(used to calculate the annual license fee)

	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_x	CO	VOC
Burner #1 & Dryer #1	90.2	90.2	90.2	3.8	30.7	90.2	49.9
Total TPY	**90.2**	**90.2**	**90.2**	**3.8**	**30.7**	**90.2**	**49.9**

2. Greenhouse Gases
   Greenhouse gases are considered regulated pollutants as of January 2, 2011, through 'Tailoring' revisions made to EPA's *Approval and Promulgation of Implementation Plans,* 40 CFR Part 52, Subpart A, §52.21, *Prevention of Significant Deterioration of Air Quality* rule. Greenhouse gases, as defined in 06-096 CMR 100 (as amended), are the aggregate group of the following gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. For licensing purposes, greenhouse gases (GHG) are calculated and reported as carbon dioxide equivalents (CO_2e).

   The quantity of CO_2e emissions from this facility is less than 100,000 tons per year, based on the following:
   - the facility's fuel use limits;
   - worst case emission factors from the following sources: U.S. EPA's AP-42, the Intergovernmental Panel on Climate Change (IPCC), and 40 CFR Part 98, *Mandatory Greenhouse Gas Reporting*; and
   - global warming potentials contained in 40 CFR Part 98.

   No additional licensing actions to address GHG emissions are required at this time.

III. AMBIENT AIR QUALITY ANALYSIS

Corinth Pellets previously submitted an ambient air quality impact analysis for air emission license A-956-71-F-A (dated December 3, 2014) demonstrating that emissions from the facility, in conjunction with all other sources, do not violate Ambient Air Quality Standards (AAQS). After taking into consideration the nature of the proposed changes, an additional air quality impact analysis is not required for this amendment.

ORDER

Based on the above Findings and subject to conditions listed below, the Department concludes that the emissions from this source:

- will receive Best Practical Treatment,
- will not violate applicable emission standards, and
- will not violate applicable ambient air quality standards in conjunction with emissions from other sources.

The Department hereby grants Air Emission License A-956-71-H-A subject to the conditions found in Air Emission License A-956-71-C-R, in amendments A-956-71-D-T, A-956-71-E-A, A-956-71-F-A, and A-956-71-G-M, and the following conditions.

Severability. The invalidity or unenforceability of any provision, or part thereof, of this License shall not affect the remainder of the provision or any other provisions. This License shall be construed and enforced in all respects as if such invalid or unenforceable provision or part thereof had been omitted.

All Specific Conditions in Air Emission Licenses A-956-71-C-R, A-956-71-E-A, A-956-71-F-A, and A-956-71-G-M are Deleted and replaced by the following:

(37) **Burner #1 and Dryer #1**

A. Burner #1 is licensed to fire wood/biomass materials. [06-096 CMR 115, BACT]

B. Corinth Pellets shall not exceed an annual production limit of 120,000 tons of pellets per year based on a 12-month rolling total. Corinth Pellets shall keep records of pellets produced on a monthly and 12-month rolling total basis. [06-096 CMR 115, BACT]

C. Emissions shall not exceed the following [06-096 CMR 115, BACT]:

Emission Unit	PM (lb/hr)	PM_{10} (lb/hr)	PM_{10} (lb/hr)	SO_2 (lb/hr)	NO_x (lb/hr)	CO (lb/hr)
Burner #1 & Dryer #1 (combined)	21.06	21.06	21.06	0.88	7.16	21.06

D. VOC lb/hr emission limits are dependent upon the mix of wood species being processed. Emissions of VOC shall not exceed the following [06-096 CMR 115, BACT]:

$$[8.55 \times \%\ hardwood] + [17.95 \times \%\ other\ softwood] + [37.60 \times \%\ pine] = VOC\ lb/hr\ limit$$

E. Corinth Pellets shall not exceed total annual emissions of 49.9 tons per year of VOC. [06-096 CMR, 115, BACT]

F. To demonstrate compliance with the annual VOC emission limit, Corinth Pellets shall maintain records of the tons of pellets produced and the mix of wood species (i.e. percentage hardwood, pine, and softwood other than pine) processed on a monthly and 12-month rolling total basis. Corinth Pellets shall calculate emissions of VOC on a monthly and 12-month rolling total basis using the following formula [06-096 CMR 115, BACT]:

$$[(0.614 \times \%\ hardwood) + (1.286 \times \%\ other\ softwood) + (2.686 \times \%\ pine)\ ] \times \left[\frac{tons\ pellets}{2000}\right] = ton\ VOC$$

G. Burner #1 shall exhaust through Dryer #1. Dryer #1 shall exhaust to a cyclone and exit through Stack #1 except for periods of startup, shutdown, or malfunction. [06-096 CMR 115, BACT]

H. Startup, Shutdown, and Malfunction

1. During periods of startup, shutdown, or malfunction, the bypass stack may be used for Burner #1 for no more than 1 hour for any event. If the startup, shutdown, or malfunction event lasts longer than 1 hour, Corinth Pellets shall either shut the unit down for at least a one hour period or the opacity limit for Stack #1 shall apply to the visible emissions from the bypass stack.
2. Records shall be maintained documenting startups, shutdowns, and malfunctions. These records shall include dates, times, duration, cause, method utilized to minimize duration of the event and/or to prevent reoccurrence, and whether the bypass stack was utilized and for how long.

[06-096 CMR 115, BACT]

I. Visible emissions from Stack #1 shall not exceed 30% opacity on a six (6) minute block average, except for no more than two (2) six (6) minute block averages in a continuous 3-hour period. [06-096 CMR 101]

J. Stack #1 shall be at least 84 feet above ground level. [06-096 CMR 115, BACT]

K. Dryer Inlet Temperature

1. Corinth Pellets shall not exceed an inlet temperature to Dryer #1 of 800°F when processing hardwood and softwood species other than pine or a pine mix less than 25% by weight. When processing all pine or a pine mix greater than 25% by weight, Corinth Pellets shall not exceed an inlet temperature to Dryer #1 of 650°F.
2. Corinth Pellets shall continuously monitor and record the inlet temperature of Dryer #1 to demonstrate compliance with the temperature limits listed above. "Continuously" is defined as at least three (3) data points in each full operating hour with at least (1) data point in each half-hour period.
3. Corinth Pellets shall train each of its lead drying line operators how to monitor and determine whether or not the fraction of pine being processed is above or below 25% by weight. Corinth Pellets shall record in a log the date, time, and duration of any periods when greater than 25% pine is processed.
4. Upon request from the Department, Corinth Pellets shall develop and submit a plan to justify the dryer inlet temperature limits listed above or to amend the dryer inlet temperature limits based on data from on-site testing or other available information.

[06-096 CMR 115, BACT]

(38) Corinth Pellets shall operate the RAF Baghouse and Dust Collector #1 at all times the Screening/Pellet Processing Operation is operating.
[06-096 CMR 115, BACT]

(39) Corinth Pellets shall maintain a log documenting maintenance activities performed on the major equipment located at the facility, including Burner #1, Dryer #1, the RAF Baghouse, Dust Collector #1 and all facility cyclones. Corinth Pellets shall record the date and location of all bag failures as well as all routine maintenance performed on this equipment. [06-096 CMR 115, BACT]

(40) Corinth Pellets shall not cause visible emissions (not including water vapor), measured as any opacity totaling twelve minutes or longer in any one hour period, to occur at ground level over any land or surrounding any buildings not owned by Corinth Pellets. Opacity from an unobscured source under this condition shall be determined pursuant to the Environmental Protection Agency's (EPA's) Method 22 - Visual determination of fugitive emissions from material sources and smoke emissions from flares contained in 40 CFR Part 60, Appendix A. [06-096 CMR 115, BPT]

(41) Corinth Pellets shall employ and have on-site during daylight operating hours at least one person who is trained and certified in determining visible emissions in accordance with EPA Test Methods 9 and 22. These certified employees shall have the authority, and shall exercise such authority, to shut down any process or activity at the facility that is causing or contributing to excess visible emissions. An employee certified in determining visible emissions shall be on-site at all times the facility is operating. [06-096 CMR 115, BPT]

(42) **Fugitive Emissions**

Visible emissions from a fugitive emission source (including stockpiles and roadways) shall not exceed an opacity of 20%, except for no more than five (5) minutes in any 1-hour period. Compliance shall be determined by an aggregate of the individual fifteen (15)-second opacity observations which exceed 20% in any one (1) hour.
[06-096 CMR 101]

(43) **General Process Sources**

Visible emissions from any general process source shall not exceed an opacity of 20% on a six (6) minute block average basis, except for no more than one (1) six (6) minute block average in a 1-hour period. [06-096 CMR 101]

(44) **Annual Emission Statement**

In accordance with *Emission Statements*, 06-096 CMR 137 (as amended), the licensee shall annually report to the Department the information necessary to accurately update the State's emission inventory by means of either:

1) A computer program and accompanying instructions supplied by the Department; or
2) A written emission statement containing the information required in 06-096 CMR 137.

The emission statement must be submitted as specified by the date in 06-096 CMR 137.

(45) Corinth Pellets shall notify the Department within 48 hours and submit a report to the Department on a quarterly basis if a malfunction or breakdown in any component causes a violation of any emission standard (38 M.R.S.A. §605).

DONE AND DATED IN AUGUSTA, MAINE THIS 26 DAY OF October , 2015.

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BY: Marc Allen Robert Care for
AVERY T. DAY, ACTING COMMISSIONER

The term of this amendment shall be concurrent with the term of Air Emission License A-956-71-C-R.

PLEASE NOTE ATTACHED SHEET FOR GUIDANCE ON APPEAL PROCEDURES

Date of initial receipt of application: 8/14/15
Date of application acceptance: 8/14/15

Date filed with the Board of Environmental Protection:

This Order prepared by Lynn Muzzey, Bureau of Air Quality.

Filed
OCT 26 2015
State of Maine
Board of Environmental Protection